

Publication number 2001-138626

PLAIN PAPER ELECTROPHOTOGRAPHIC SHEET HAVING INK JET SUITABILITY

[Claim(s)]

[Claim 1] A regular paper electro photography paper with ink jet fitness, wherein Kaminaka's total chlorine content is 500 ppm or less and organic salt matter content is 150 ppm or less.

[Claim 2] A regular paper electro photography paper which has the ink jet fitness according to claim 1 forming a coating layer which does not contain a chlorine compound in a film transfer roll coater in stencil paper which consists of an ECF bleached pulp.

[Claim 3] Coating weight of a coating layer which does not contain a chlorine compound by film transfer roll coater coating is $10 \text{ g/m}^2 \cdot 20 \text{ g/m}^2$ by both sides of stencil paper, A regular paper electro photography paper in which bone-dry coverage has the ink jet fitness according to claim 1 or 2 being $0.05 \text{ g/m}^2 \cdot 0.5 \text{ g/m}^2$ by $0.007 \text{ g/m}^2 \cdot 0.06 \text{ g/m}^2$, and mineral by a surface-size agent.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]The regular paper electro photography paper with ink jet fitness is used as a paper of the copy machine of an indirect electrophotographing system, and a printing machine, and also these days, it is used widely also as a print form of an ink jet printer at an office and a home. After printing, when it becomes unnecessary, a part is recycled as a recycled paper raw material, but most portion is incinerated as domestic garbage as industrial waste.

[0002]

[Description of the Prior Art]After the regular paper electro photography paper with ink jet fitness usually using wood pulp as a raw material, blending a loading material, a sizing compound, etc. with this and forming a sheet with a paper machine, by size press etc., carry out the surface treatment of a surface-size agent, the conducting agent, etc., and manufacture them, but. In order that wood pulp may make wood required whiteness after digestion, it is usually that what carried out bleaching processing is used.

[0003]Although it processes sequentially with several kinds of medicine and is finished in the target whiteness at a bleaching process, gaseous chlorine has so far been used as a typical medicine of bleaching. If gaseous chlorine bleaches, the lignin in pulp, etc. will react to chlorine, what is called an organochlorine compound will be formed, and separation removal of the most will be carried out from pulp in process, but it is known that the part remains in pulp.

[0004]Therefore, the regular paper electro photography paper with the ink jet fitness manufactured using the pulp built with the above-mentioned process, When toxic substances, such as dioxins, are contained including an organochlorine compound in it although it is little further very much, and incineration processing is carried out after becoming unnecessary after use, there is a possibility that the organochlorine compound which exists in Kaminaka may cause a dioxin generation.

[0005]Of course, organochlorine compound concentration, such as Kaminaka's dioxins, is not a level made into a problem with such bleaching art, either. However, when destroyed by fire, it is intermingled with general refuse, and **** conditions always cannot say the best conditions about generating of dioxin, but with loss in quantity of paper garbage. The paper product in which reducing the organochlorine compound concentration in the pulp which is considered when it comes to the source of release of dioxin as much as possible contains an electro photography paper is also asked.

[0006]Although the various additive agent and processing agent is used like the above-mentioned in manufacture of a regular paper electro photography paper with ink jet fitness, it is a conducting agent that there is a possibility that many chlorine compounds may be included in these. Although the regular paper electro photography paper with ink jet fitness needs to set the surface electric resistance to $10^9 \sim 10^{11} \Omega$, a conducting agent serves to lower the electric resistance value of a sheet to a desired value by processing it to a paper sheet.

[0007]The substance, for example, sodium chloride, in which an inorganic or organic electrolyte is used and the conducting agent used here generally contains chlorine as a component, ammoniumchloride, etc. are the example of representation. Although chlorine in these substances exists in the form of a chloride ion in solution, a chloride ion is related to a dioxin generation to the same extent as the organochlorine compound contained in the above-mentioned pulp -- but -- there is nothing -- even if you carry out, chlorine should use what kind of form at least -- existing has doubt of substance generating harmful to environment, and it is not a desirable thing.

[0008]According to JP,5-23794,A, as solution to these problems, for example. By using the recycled pulp bleached only with hydrogen peroxide in printing of the copying machine of an indirect electrophotographing system, a printer, a printing machine, etc., and manufacture of the recycled paper used for an information use, Although the ethanol meltable organicity halogen content as alternate indicators of a dioxin generation is dedicated to 110 ppm or less, if the pulp bleached with gaseous chlorine in used paper is contained, it will be thought that it does not lead to problem solving fundamentally, and the actual condition is still not having solved the problem.

[0009]Ink jet fitness must be given to the regular paper electro photography paper with ink jet fitness. Ink jet fitness is what does not cause the phenomenon in which ink is called feathering which spreads in the shape of a fluff in a paper face, when printed with an ink jet printer.

[0010]Although ink jet fitness adjusts and gives the addition of an internal sizing compound, and the coverage of the surface-size agent which carried out externally adding, after forming a web generally, it is given by applying a surface-size agent with coating apparatus, such as size press and a film transfer roll coater.

[0011]Size press is a device which squeezes out excessive liquid, after dipping a web in coating liquid. When using size press, since a web is dipped in the coating liquid containing a conducting agent and a surface-size agent, uniform adhesion of a surface-size agent accomplishes, and good ink jet fitness is easy to be acquired generally.

[0012]Since the film transfer roll coater can apply the high coating liquid of solid

content compared with size press and is connected with reduction of dry energies, it is introduced instead of size press in recent years. when a film transfer roll coater was used, when coating liquid did not cover the web surface uniformly, there was a problem that a regular paper electro photography paper with good ink jet fitness did not have profit on the character in which measure coating liquid front and it is made to transfer. [0013]

[Problem(s) to be Solved by the Invention]It is in the purpose of this invention obtaining the regular paper electro photography paper which has the ink jet fitness outstanding using a coating apparatus which is solving these problems, and reduces the quality of a chlorine inclusion with fear harmful to environment as much as possible, and is represented by the film transfer roll coater.

[0014]In order to specifically reduce the quality of a chlorine inclusion with fear harmful to environment, a chlorine content uses the fewest possible things for the conducting agent processed to the bleaching processing of pulp and the paper sheet which are the cause of mixing of chlorine, And since it has the ink jet fitness which was excellent even if it used the coating apparatus which performs pre-measuring of coating liquid, it is going to adjust and solve the coating weight of coating liquid.

[0015]

[Means for Solving the Problem]In order to solve an aforementioned problem, in this invention, it is considered as a regular paper electro photography paper with ink jet fitness, wherein Kaminaka's total chlorine content is 500 ppm or less and organic salt matter content is 150 ppm or less.

[0016]In this invention, a coating layer which does not contain a chlorine compound in stencil paper which consists of ECF pulp in a film transfer roll coater is formed. Coating weight of a coating layer which does not contain a chlorine compound by film transfer roll coater coating is $10 \text{ g/m}^2 \cdot 20 \text{ g/m}^2$ by both sides of stencil paper, Bone-dry coverage is $0.05 \text{ g/m}^2 \cdot 0.5 \text{ g/m}^2$ in $0.007 \text{ g/m}^2 \cdot 0.06 \text{ g/m}^2$, and mineral at a surface-size agent.

[0017]That Kaminaka's total chlorine content is 500 ppm or less, and organic salt matter content set to 150 ppm or less in this invention, Although he would like to lessen a chlorine content as much as possible originally, it is because it was industrially considered as a range which can be attained easily combining TCF with few chlorine compounds, ECF pulp *****, and a conducting agent that does not use a chlorine compound with the present art.

[0018]In this invention, after carrying out digestion of the pulp, it uses what was bleached to a desired whiteness degree with bleaches other than gaseous chlorine. Although pulp used here generally uses wood as a raw material, non-wood, such as

bagasse and a kenaf, may be used depending on the case. As bleaches other than gaseous chlorine, although oxygen, a chlorine dioxide, sodium hypochlorite, ozone, hydrogen peroxide, peracetic acid, etc. are mentioned, A bleaching process of making a chlorine dioxide into a subject is advanced industrially among these, Gaseous chlorine of a thing using a compound in which this contains chlorine in structure is a method which is not used, and pulp manufactured by this method is usually called ECF (Elemental Chlorine Free) pulp.

[0019]Chlorine-bleaching pulp which is this ECF pulp (pulp bleached after digestion at a process of an oxygen -> chlorine dioxide -> alkali ->-> chlorine dioxide), and a conventional method as an example (after digestion) Oxygen -> chlorine -> alkali -> sodium hypochlorite -> if chlorinity and the amount of dioxin in pulp bleached with a chlorine dioxide are measured, a result as shown in Table 1 is obtained, and it is clear that ECF pulp's **** has little an organic salt quantum and the amount of dioxin compared with chlorine-bleaching pulp.

[0020]Although pulp manufactured with a bleaching method (chisels, such as ozone and hydrogen peroxide, are used) which does not use a chlorine compound with gaseous chlorine as a bleach, either is usually called TCF (TotalChlorine Free) pulp, naturally there are few chlorinity in this pulp and amounts of dioxin.

[0021]ECF pulp and TCF pulp are recommended in this invention. In addition, although it can use together with mechanical pulp, recycled pulp, etc. if needed, all the chlorinity is 500 ppm or less as paper also in this case, and organic salt matter content needs to be 150 ppm or less.

[0022]If needed, using obtained ECF pulp as a raw material Thus, a paper durability agent, A web is formed with a paper machine of a long network type and a round mesh type from a pulp slurry which contains an internal sizing compound, a loading material, a color, etc., and a surface-size agent and starch coating liquid containing a conducting agent which does not contain chlorine in a main constitution thing in a film transfer roll coater are applied.

[0023]In this invention, a film transfer roll coater is a coating apparatus, and gate roll coater, a transfer roll coater, a braid or a rod metaling size press coating machine, a SIMM sizer, a speed sizer, etc. are specifically used.

[0024]Cation starch, poly acrylamide, etc. are used as a paper durability agent. As an internal sizing compound, acid rosin size, neutral rosin size, an alkenyl succinic anhydride, an alkyl ketene dimer, etc. are used. As a loading material, kaolin, clay, calcium carbonate, talc, titanium oxide, silicic acid aluminum, etc. are used.

[0025]Coating liquid used for a film transfer roll coater consists of starch/a surface size,

and a conducting agent, and liquid coating weight in a wet state of coating liquid forms a coating layer as $10 \text{ g/m}^2 \cdot 20 \text{ g/m}^2$ by both sides.

[0026] Adjustment of coverage by a film transfer roll coater is performed by mechanical usually or changing viscosity of coating liquid, and solid content. Although coating liquid is mainly adjusted by solid content of starch by a wet state to a double-sided $10 \text{ g/m}^2 \cdot 20 \text{ g/m}^2$ attachment ** sake, it can also be adjusted with thickeners, such as PVA and CMC. If it is a case of phosphorylation starch (MS4600 product made from Japanese food processing), it is 9% - about 13% of solid content.

[0027] When there is less liquid coating weight in a wet state of coating liquid than double-sided 10 g/m^2 , even if coverage of a surface-size agent is enough, ink jet fitness is inferior. Since this transfers with a roll after a film transfer roll coater front-measures coating liquid, this invention persons think that the homogeneity of a sizing compound is not enough.

[0028] When there is more liquid coating weight in a wet state of coating liquid than double-sided 20 g/m^2 , although ink jet fitness is excellent, On the other hand, a problem to which solid content, such as starch and PVA, becomes high in order to make viscosity of coating liquid high, therefore such bone-dry coverage increases, and opacity of paper falls and to which the waist becomes strong that a manufacturing cost also becomes high arises.

[0029] A substance which does not have chlorine in the structure is used for a conducting agent in coating liquid. As a thing applicable to this, sodium sulfate, sodium hydroxide, sodium carbonate, sodium aluminate, etc. are raised by mineral salt. Although polymer electrolytes other than mineral salt (for example, a polystyrene sulfonate salt etc.) can also be used, there is a problem to which a manufacturing cost becomes high.

[0030] When there are few amounts of bone-dry double spread of mineral salt than 0.05 g/m^2 , a surface electric resistance value of paper becomes higher than $10^9 \cdot 10^{11} \Omega$, and it is not suitable as an electro photography paper. When more by both sides than 0.5 g/m^2 , a surface electric resistance value is too low, and it is not suitable as an electro photography paper.

[0031] As a surface-size agent in coating liquid, styrene acrylic acid, styrene maleic acid, etc. are used. The amount of bone-dry double spread of a surface-size agent is the range of $0.007 \text{ g/m}^2 \cdot 0.06 \text{ g/m}^2$. When less than double-sided 0.007 g/m^2 , even when distribution of a sizing compound is uniform, absolute magnitude does not have ink jet fitness few. Since the absorptivity of ink jet ink not only becomes late, but a manufacturing cost becomes high when more than 0.06 g/m^2 double-sided 2 , it becomes a problem.

[0032]As an index of a substance harmful to environment contained in a regular paper electro photography paper which has the ink jet fitness made as mentioned above, total chlorinity and an organic salt quantum are taken up by this invention. Using the Mitsubishi Kasei make, chlorine, and sulfur analysis apparatus TSX-10, total chlorinity burned about 10 mg of samples, and was calculated by a fixed quantity of chloride ion by electrical quantity ****. Kaminaka's chlorinity is calculated regardless of organic salt matter and mineral salt matter by this measurement. A value which deducted a mineral salt quantum from total chlorinity was used for an organic salt quantum. A mineral salt quantum carried out the hot water extract of 5 g of the samples, measured a chloride ion in an extract with ion chromatography, and asked for it.

[0033]

[Table 1]

	ECF漂白法 パルプ	従来法 塩素漂白パルプ
有機塩素量	80 p p m	260 p p m
ダイオキシン含有量	0.004 p p t	0.22 p p t

ダイオキシン含有量の測定：平成9年2月厚生省環境整備課より指示された「廃棄物処理におけるダイオキシン類測定マニュアル」に従った。

1 p p t = 1 p g / g = 1 兆分の 1

[0034]

[Embodiment of the Invention]An example is shown below and this invention is explained to it in detail. This invention is not limited to this. All % of the following are based on weight.

The pulp bleached without using example 1 gaseous chlorine, and ECF pulp ** for the whole quantity, Calcium carbonate (product made from Okutama industry TP121) as a loading material 5% of the rate of ash, A neutral rosin size agent (Japan PMC CC-167) 0.4% for pulp, Stencil paper paper milling is carried out with a Fourdrinier machine by the pulp combination which added the liquefied band 2% and added 500 ppm of colloidal silica (made in BMA-O Nissan Eka Chemicals) for cation starch (Kate 308) as a yield agent 1%, The regular paper electro photography paper which applies 3% of sodium sulfate as a conducting agent as coating liquid in gate roll coater 9% of starch (MS4600 made from Japanese food processing) and surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.1%, and has ink jet fitness was milled. The

coating weight of coating liquid was double-sided 11 g/m². The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0035]In example 2 gate roll coater, as coating liquid 13% of starch (product made from Japanese food processing MS4600), The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having applied 2.0% of sodium sulfate as a conducting agent surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.1%. The coating weight of coating liquid was double-sided 15 g/m². The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0036]In example 3 gate roll coater, as coating liquid 10% of starch (product made from Japanese food processing MS3800), The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having applied 2.0% of sodium sulfate as a conducting agent surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.3%. Coverage was double-sided 17 g/m². The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0037]In example 4 gate roll coater, as coating liquid 5% of starch (product made from Japanese food processing MS4600), Surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.3%, as a conducting agent, in order to attach coverage by thickening of coating liquid, 2.0% of sodium sulfate, The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having applied the thickener 0.1% (CMC cello gene Dai-Ichi Kogyo Seiyaku). Coverage was double-sided 17 g/m².

[0038]The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having used 0.4% of sodium chloride for the pulp by which comparative example 1 chlorine bleaching was carried out as ** for the whole quantity, and a conducting agent. The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0039]The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having used 0.4% of sodium chloride as comparative example 2 conducting agent. The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0040]In comparative example 3 gate roll coater, as coating liquid 5% of starch (product

made from Japanese food processing MS4600), The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having applied 5.0% of sodium sulfate as a conducting agent surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.5%. Coverage was double-sided 6 g/m². The measurement result of a total chlorinity and organic salt quantum and a mineral salt quantum and the result of ink jet fitness were shown in Table 2.

[0041]In comparative example 4 gate roll coater, as coating liquid 16% of starch (product made from Japanese food processing MS4600), The regular paper electro photography paper with ink jet fitness was milled like Example 1 except having applied 2.0% of sodium sulfate as a conducting agent surface-size agent (product made from Arakawa chemicals poly chestnut 1343) 0.1%. Coverage was double-sided 18 g/m².

[0042]Following space [Table 2]

	実施例1	実施例2	実施例3	実施例4
漂白法	ECF	ECF	ECF	ECF
塗布液付着量 g/m ²	11	15	17	17
澱粉塗布量 g/m ²	0.99	1.95	1.7	0.85
チタニウム塗布量 g/m ²	0.011	0.015	0.051	0.051
硫酸ナトリウム塗布量 g/m ²	0.33	0.30	0.34	0.34
有機塩素量 ppm	80	80	80	80
無機塩素量 ppm	280	290	280	290
全塩素量 ppm	360	370	370	380
フェザリング	良好	良好	良好	良好
不透明度	82	81	81.5	82

	比較例1	比較例2	比較例3	比較例4
漂白法	塩素漂白	ECF	ECF	ECF
塗布液付着量 g/m ²	11	11	6	18
澱粉塗布量 g/m ²	0.99	0.99	0.3	2.88
チタニウム塗布量 g/m ²	0.022	0.022	0.03	0.018
導電剤塗布量 g/m ²	NaCl 0.044	NaCl 0.044	硫酸ナトリウム 0.8	硫酸ナトリウム 0.86
有機塩素量 ppm	250	80	80	80
無機塩素量 ppm	1000	1000	400	400
全塩素量 ppm	1250	1080	480	480
フェザリング	良好	良好	不良	良好
不透明度	82	82	82	79.5

[0043]

[Effect of the Invention]This invention can obtain the regular paper electro photography paper which has the ink jet fitness outstanding using a coating apparatus which reduces the quality of a chlorine inclusion with fear harmful to environment as much as possible, and is represented by the film transfer roll coater so that the above-mentioned explanation may show.

[0044]This invention solves the problem that coating liquid is not uniformly covered by

the web surface by using a film transfer roll coater, by adjustment of the coating weight of coating liquid, It can have the ink jet fitness which was excellent even if it used the film transfer roll coater, and, in 500 ppm or less and organic salt matter content, Kaminaka's total chlorine content can obtain a regular paper electro photography paper with ink jet fitness of 150 ppm or less further.

Abstract:

PROBLEM TO BE SOLVED: To provide a plain paper electrophotographic sheet having excellent ink jet suitability using a coating device represented by a film transfer roll coater by reducing a chlorine-containing substance having a fear of a harm in an environment.

SOLUTION: The plain paper electrophotographic sheet having ink jet suitability comprises a total chlorine-containing amount in the sheet of 500 ppm or less and an organic chlorine-containing amount of 150 ppm or less.